

REMARKS

Entry of the foregoing, reexamination and reconsideration of the subject application, as amended, pursuant to and consistent with 37 C.F.R. § 1.112, are respectfully requested in light of the remarks which follow.

I. Amendments to the Claims

By the foregoing amendments to the claims, claims 1, 12, 16, 27 and 31 have been amended.

The amendments to the claims have been made to clarify the claim language, for consistency, and to bring the claims into better conformance with U.S. patent practice. These amendments are merely editorial in nature and are not intended to change the scope of the claims or any elements recited therein.

The amendments to the claims have been made without prejudice or disclaimer to any subject matter canceled or recited herein. Applicants reserve the right to file one or more continuation and/or divisional applications directed to any canceled subject matter. No new matter has been added, and entry of the foregoing amendments of the above-identified application is respectfully requested.

II. Response to Objection to the Claims

At page 2 of the Office Action, claim 1 has been objected to for reciting the phrase "comprising contacting an amide compound-containing solution in contact with activated carbon."

To expedite prosecution in the present application, and not to acquiesce to the Examiner's rejection, the claims have been amended as set forth above. In particular, claim 1 has been amended by canceling the phrase "in contact," as suggested by the Examiner.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the claim objection.

III. Response to Claim Rejections Under 35 U.S.C. § 112, Second Paragraph

At pages 2-3 of the Office Action, claims 1, 3, 9, 11-16 and 25-31 have been rejected under 35 U.S.C. § 112, second paragraph, as purportedly being indefinite.

In particular, the Examiner has stated that the meaning of the phrases "microorganism fungus body" and "processed products of the microorganism fungus body" are not clear. According to the Examiner, the specification discloses bacterial strains, rather than fungal strains, such as an *E. coli* strain transformed with a polynucleotide encoding bacterial nitrile hydratase (i.e. MT-10827).

To expedite prosecution in the present application, and not to acquiesce to the Examiner's rejection, the claims have been amended by replacing the phrases "microorganism fungus body containing nitrile hydratase" and "processed product of the microorganism fungus body" with "microorganism comprising a nitrile hydratase, or a processed product of the microorganism, wherein the processed product comprises nitrile hydratase."

Applicants respectfully submit that the claims as amended particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Accordingly, Applicants respectfully request reconsideration and withdrawal of this rejection.

IV. Response to Claim Rejections Under 35 U.S.C. § 112, First Paragraph

At pages 3-4 of the Office Action, claims 1, 3, 9, 11-16 and 25-31 have been rejected under 35 U.S.C. § 112, first paragraph, as purportedly failing to comply with the written description requirement.

Specifically, the Examiner has acknowledged that the specification sufficiently describes nitrile hydratases. However, the Examiner has further stated that the specification does not sufficiently describe "a processed product of the microorganism fungus body." In this regard, the Examiner appears to consider that the claims as currently drafted encompass "processed products" that do not comprise a nitrile hydratase enzyme. In addition, similar to the indefiniteness rejection (see above), the Examiner has stated that the microorganisms described in the present specification are bacteria, not fungi. Thus, the Examiner has concluded that a person of ordinary skill in the art would not know what kinds of "microorganism fungus body" or "processed product of a microorganism fungus body" would be suitable for the present invention.

As noted above, the claims have been amended to recite "a processed product of the microorganism," rather than "a processed product of the microorganism fungus body," and to clarify that the "processed product" comprises nitrile hydratase.

Applicants submit that the claims as amended recite subject matter which was described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. Accordingly, Applicants respectfully request reconsideration and withdrawal of this rejection.

V. Response to Claim Rejections Under 35 U.S.C. § 103(a)

At pages 5-7 of the Office Action, claims 1, 3, 9, 11-16 and 25-31 have been rejected under 35 U.S.C. § 103(a) as purportedly being unpatentable over Oriel et al. (WO 99/55719) in view of Chen (J. Biol. Chem., 1967).

Specifically, the Examiner has stated that Oriel et al. teaches a process for producing acrylamide, comprising contacting nitrile hydratase-expressing cells (BR449 cells) with acrylonitrile, then treating the acrylamide solution (i.e. the reaction mixture) with activated charcoal. The Examiner relies on Chen for teaching removing impurities using acid-charcoal treatment at an acidic pH range of 3-7. It is the Examiner's position that it would have been obvious for a person of ordinary skill in the art to optimize the pH and temperature of the reaction mixture in order to obtain the highest and most purified yield of the amide compound. This rejection is respectfully traversed, for at least the following reasons.

Submitted herewith is a Declaration Under 37 C.F.R. § 1.132 of a named inventor (Kiyoshi Ito) in the present application. The Declaration demonstrates that the methods recited in the present claims provide unexpected results as compared to the closest methods taught in the cited references. In particular, the data set forth in the Declaration shows that in an acrylamide solution obtained by a nitrile hydratase hydration reaction of acrylonitrile, protein can be effectively removed by treating with activated charcoal under the pH range recited in claim 1 (i.e. from 3.5 to 6.5).

In the Office Action, the Examiner has stated that activating charcoal by acid treatment was known in the art, and that one of ordinary skill would have recognized that nitrile compounds containing an unsaturated bond are stable in acidic conditions (see page 6, lines 8-10 of the Office Action).

In response, Applicants submit that although Oriel et al. discloses activated charcoal treatment of acrylamide solutions to remove contaminants, the reference does not teach or suggest activated charcoal treatment under acidic conditions. Furthermore, Oriel et al. relates

to the effects of pH in hydration reactions of acrylonitrile by BR449 nitrile hydratase to give acrylamide, and shows that EB449 (nitrile hydratase) demonstrates a broad pH optimum for activity with a maximum near pH 7.5 (see page 28, lines 36-38 of Oriel et al.). Therefore, in the reference examples the hydration reaction of acrylonitrile to acrylamide with nitrile hydratase 13R449 is carried out in a potassium phosphate buffer solution at pH 7.5 or 8 (see page 32, lines 26-29 (Example 3), page 33, lines 23-25 (Example 4), etc.). In the results section, the authors note that the obtained acrylamide solution indicates weak alkali. Since the nitrile hydratase hydration reaction was also conducted in 0.3 mmol NaOH solution in the present application, the obtained acrylamide solution was 8. Therefore, ordinarily, the weakly alkaline acrylamide solution is treated with activated carbon, wherein acrylamide is stable. Thus, one of ordinary skill in the art at the time the invention was made would not have reasonably predicted from the description of Oriel et al. that acrylamide is stable in acidic conditions.

In addition, the Examiner has stated that Chen et al. teaches steps for removing lipid in the protein by acid-charcoal treatment, using a pH range of pH 3 to 7 (see page 6, lines 14-15 of the Office Action). The Examiner has further stated that, since lipid impurities are expected to be contained within "microorganism fungus body", and "process product of the microorganism fungus body", one of ordinary skill in the art would have recognized that in order to remove such lipid impurities from the reaction mixture, acid-charcoal treatment using an acidic range of pH 3 to pH 7 at 2°C is required (see page 6, lines 16-22 of the Office Action).

Chen et al. teaches a method for removing lipid in the protein by acid-charcoal treatment, using a pH in the range of 3 to 7. In addition, the effect of pH on the removal of palmitate (lipid) from BSA (protein) is illustrated in Fig. 1 of the reference. As is clear from Fig. 1, when the pH of the albumin solution goes up from 4, the remaining amount of palmitate suddenly increases. This means that when the pH of the protein solution is more than 4, the removing ratio of the lipid becomes low. Therefore, Chen et al. does not teach or suggest that lipid can be removed with a good yield from the protein solution in a pH range of from 4 to 7.

On the other hand, the present claims recite contacting an amide compound-containing solution with activated carbon under acidic conditions of from pH 3.5 to 6.5 (see claim 1). As can be seen from the Declaration Under 37 C.F.R. § 1.132, submitted herewith,

as the pH of the amide solution goes up from 3 to 4, the removing ratio of protein after acid treatment with the activated carbon become high, and as the pH goes up from 6 to 7, it suddenly becomes low. Therefore, using the method recited in the present claims (i.e. a pH of from 3.5 to 6.5), proteins present in the amide compound-containing solution can be effectively removed.

As mentioned above, since Chen et al. teaches that lipids can not be sufficiently removed from a protein solution in a pH of from 4 to 7, one of ordinary skill in the art at the time the invention was made would not have reasonably predicted that when an amide compound-containing solution is contacted with active carbon under acidic conditions of from pH 3.5 to 6.5, as claimed in claim 1, protein in the amide compound-containing solution obtained by nitrile hydratase hydration reaction of nitrile compound would be effectively removed.

In view of the above, Applicants submit that the references cited by the Examiner, taken alone or in combination, do not teach or suggest the subject matter of the present claims. Accordingly, Applicants respectfully request reconsideration and withdrawal of this rejection.

VI. Response to Double Patenting Rejection

At pages 7-9 of the Office Action, claims 1, 3, 9, 11-16 and 25-31 have been rejected on the ground of nonstatutory obviousness-type double patenting as allegedly being unpatentable over claims 1-4 of U.S. Patent No. 6,849,432.

To expedite prosecution in the present application, and not to acquiesce to the Examiner's rejection, Applicants have submitted herewith a duly executed Terminal Disclaimer. Accordingly, this rejection has been obviated.

CONCLUSION

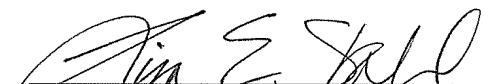
In the event that there are any questions related to this response, or the application in general, it would be appreciated if the Examiner would telephone the undersigned attorney at the below-listed telephone number concerning such questions so that prosecution of this application may be expedited.

Respectfully submitted,

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Date: March 25, 2009

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